

**CITY COUNCIL
CITY OF EXETER**

**URBAN WATER
MANAGEMENT PLAN
2010**

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CHAPTER ONE – INTRODUCTION

LAW

Water Code Section 10610-10610.4

10610. This part shall be known and may be cited as the “Urban Water Management Planning Act.”

10610.2 The Legislature finds and declares...:

...This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4 The Legislature finds and declares that it is the policy of the state as follows:

- (a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.*
- (b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.*
- (c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.*

1.1 The Urban Water Management Planning Act

The California Urban Water Management Planning Act (UWMPA) of 1983 established a management policy for the demand and efficient use of urban water, as outlined in the California Water Code Division 6, Part 2.6, Section 10610-10657. In accordance with the UWMPA, all urban water suppliers providing water to more than 3,000 customers or more than 3,000 acre-feet of water per year are required to submit or update their Urban Water Management Plan (UWMP) every five years to the Department of Water Resources. Since Exeter’s Water System Master Plan of September 2008 determined that the City has more than 3,000 connections, the City of Exeter is an urban water supplier subject to preparing an UWMP. This report constitutes the 2010 UWMP for the City of Exeter.

The Code requires that a UWMP must include historic, current and future supplies and demands for water; address conservation measures, and describe potential supply deficiencies during drought conditions and the ability to mitigate these conditions; compare total projected water use and water supply sources over 20 years in 5-year increments, for a single dry water year and for multiple dry water years; and provisions for recycled water use, demand management measures, and a water shortage contingency plan. A copy of the governing Code sections is included in Appendix A hereto; pertinent excerpts therefrom precede and are included in the Chapters in this UWMP.

In addition to some changes in the UWMPA since the last UWMPs were submitted in 2005, Governor Schwarzenegger established his 20x2020 Plan. This Plan determines that for California to continue to have enough water to support its growing population, the State needs to reduce the amount of water each person uses per day (Per Capita Daily Consumption, which is measured in gallons per capita per day). This reduction of 20 percent per capita use by the year 2020 is supported by legislation passed in November 2009, SB x 7_7 (Steinberg) Water conservation. As a result new law changes have amended and repealed some sections of the Water Code and affect our reporting requirements under the UWMPA and other government codes.

1.2 Previous City Urban Water Management Plans

In September of 2009, the City of Exeter exceeded 3,000 water service connections and thus triggered the state requirement to submit an UWMP. The City of Exeter submitted the 2005 UWMP on September 21, 2009 to the Department of Water Resources (DWR). After several state reviews and re-submissions, the City of Exeter received DWR approval of the City's 2005 UWMP on January 27, 2011.

1.3 Background of Water Supply in Exeter

The City of Exeter came into existence 1888 as a development along the Southern Pacific Railroad. Development of water resources aided in the growth of the agricultural and ranching industries. In 1900 Frank Teague started a water system consisting of a shallow well and an elevated tank near the center of town. Exeter was incorporated in 1911 and started water service to the community with two wells and an elevated 100,000 gallon tank for storage. This tank is still in use. As the city has grown, the water supply system has been improved and enlarged. In 1975 Quad Consultants prepared a Master Plan for the City of Exeter Water System. At that time the City had a population of about 5,000 and had 4 deep wells, the original elevated 100,000 gallon tank and two ground level 200,000 gallon tanks supplying groundwater to its customers. Two of those wells have been taken out of production and five new wells have been constructed and brought on line. Two of the production wells, E5W and E6W, require public notification before use due to DBCP contamination. An elevated 100,000 gallon tank and four hydropneumatic tanks provide storage and pressure regulation. Groundwater remains the sole source of water to the City.

The intent of this plan is to ensure that groundwater remains an adequate source of water for the City without the need of importing water from other locations. In line with these goals, this plan monitors water production demands and encourages water conservations practices.

1.4 Public Participation, Plan Adoption

LAW

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published...After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

In accordance with the UWMPA, the City plans to hold a public hearing regarding the 2010 UWMP for Council consideration. Fourteen days prior to Council consideration, a notice of the public hearing will be published in the local newspaper to notify interested parties that the Draft 2010 UWMP is available at various City facilities for review. A copy of the public notice is located in Appendix T. [Checklist #55/56, §10642]

After Council and public comments have been addressed, the Council will adopt a Final Draft UWMP for submittal to the Department of Water Resources (DWR) for Review. A copy of the proposed resolution adopting Final Draft UWMP is located in Appendix J. Once approved the adopting resolution will be added in Appendix Q. [Checklist #57, §10642]

After the submittal to the DWR, the City will submit a copy of the UWMP to the California State Library and to local pertinent agencies within 30 days. The UWMP distribution plan is located in Appendix U. [Checklist #54/59, §10635(b), §10644(a)]

After the submittal to DWR, the City will make the Final Draft UWMP available for public review at the City Hall within 30 days as required by §10645. [Checklist #60, §10645]

Once the Final Draft UWMP has addressed the DWR comments and has been approved by DWR, the resulting Final UWMP will then replace the Final Draft UWMP and will be made available from the City Hall upon request.

The City will utilize the conceptual timeline that is located in Appendix U as a guide for UWMP implementation. [Checklist #58, §10643]

1.5 UWMP Amendments

LAW

10641(c). The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Any amendments or changes to the final UWMP will be incorporated into a revised UWMP and available from the City Hall upon request. There are no current amendments to the UWMP. [Checklist #7, §10621(c)]

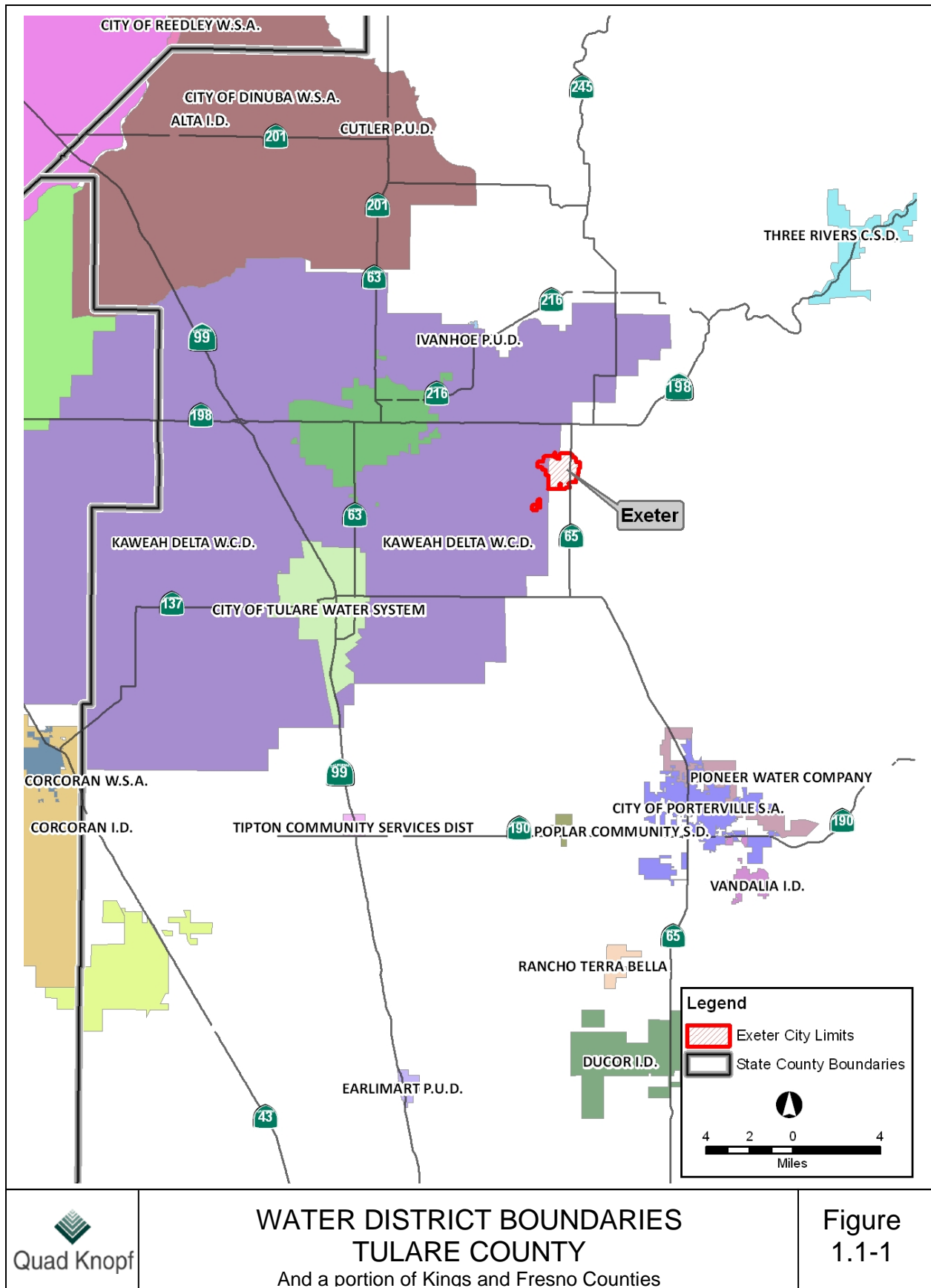
1.6 Agency Coordination

LAW

10620 (d) (2). Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

The City of Exeter 2010 UWMP is intended to address those aspects of the Act which are under the control of the City, specifically water supply and water use. While preparing the 2010 UWMP, the City coordinated its efforts with relevant local agencies to ensure that the data and issues are presented accurately. The City has furnished copies of the draft Plan to and requested comments by Kaweah Delta Water Conservation District. Although the City is not included within District boundaries (see Figure 1-1) they are adjacent to the City and their activities affect the groundwater basin from which the City draws its water supply. Additionally, the City contacted the Department of Water Resources (DWR) to discuss the requirements of the UWMPA and obtain a checklist and other guidelines. [Checklist #4, §10620(d)(2)]

The City previously coordinated with the Tulare County Water Commission and the nearby Kaweah Delta Water Conservation District during the development of the 2005 UWMP that DWR recently approved in January 2011. Since then, the City has had continued conversations with these local agencies during the development of the 2010 UWMP. Through the continued interagency coordination over the past year and with consultation of DWR, the City has met the 60 day local agency notification as required by §10621(b). [Checklist #6, §10621(b)]



CHAPTER TWO – SERVICE AREA

The City's existing water facilities, and the recent history of their development, are described in Section 1.2 of Chapter One of this Plan.

2.1 Location

The City of Exeter is located in Tulare County approximately 180 miles north of Los Angeles and 240 miles southeast of San Francisco. The City is situated south of the intersection of State Highway 198 and State Highway 65 (see Figure 2.1-1).

2.2 Climate

The climate of the Exeter area is characteristic of that of the Southern San Joaquin Valley. The summer climate is hot and dry, while winters are cool and periodically humid. Historical climate records for the City of Exeter provide a hundred year average annual rainfall of 11 inches. For other most recent climatic data, we are referring to National Oceanic and Atmospheric Administration's (NOAA) weather station data in the city of Lindsay (See Appendix N). This is the closest NOAA weather station to Exeter and should provide similar climatic data. The mean daily maximum temperatures range from a low of approximately 46.0 degrees F in December and January to a high of about 79.4 degrees F in July. Rainfall is generally concentrated during the six months from November to April. The wettest month is March with an average rainfall of 2.57 inches. December and January typically experience heavy fog, mostly nocturnal, caused when moist cool air is trapped in the valley by high pressure systems. In extreme cases, this fog may last continuously for two or three weeks. The fog depth is usually less than 3,000 feet.

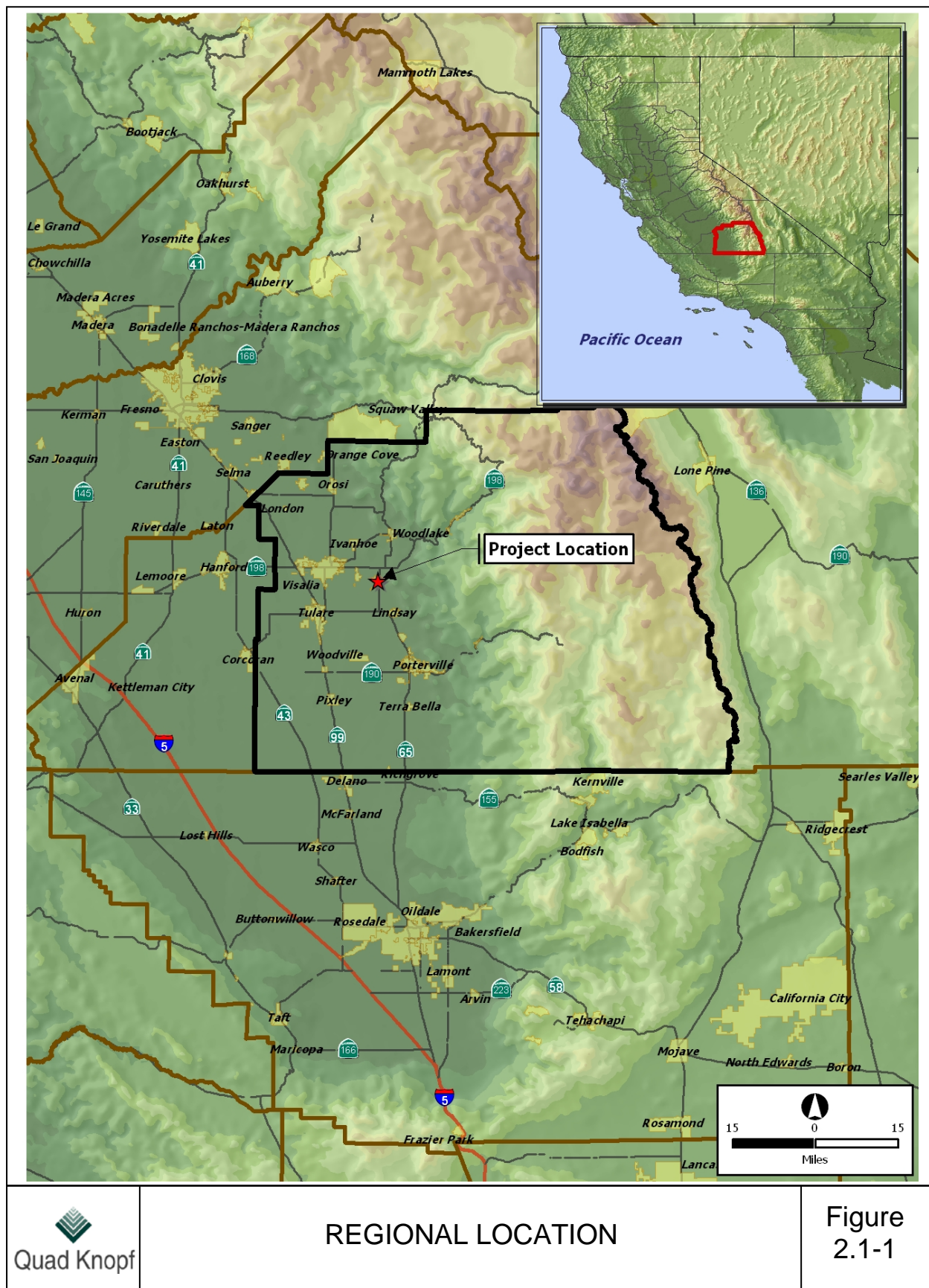
The Valley area is subject to characteristic seasonal air flows. During the summer, air currents from the Pacific Ocean enter the Valley through the San Francisco Bay and Delta region and are forced down the valley. These air movements are primarily to the southeast at velocities of six to ten miles per hour. During the winter, cold air flowing off the surrounding mountains results in currents toward the northwest at velocities ranging from zero to five miles per hour. These airflows result in extensive horizontal mixing of air masses in the Valley. However, vertical dispersion is constrained by temperature inversions, an increase in air temperature in a stable atmospheric layer, which may occur throughout the year. [Checklist #9, §10631(a)]

Climatic data pertinent to system operation and design are summarized as follows:

Table 2.2-1
Climate

	Jan	Feb	Mar	Apr	May	June	
Average Precipitation (inches)	2.44	2.25	2.57	0.90	0.41	0.13	
Average Temperature (Fahrenheit)	47.0	51.8	55.8	61.0	67.8	74.6	
	July	Aug	Sept	Oct	Nov	Dec	Annual
Average Precipitation (inches)	0.00	0.02	0.34	0.66	1.33	1.45	12.51
Average Temperature (Fahrenheit)	79.4	78.0	73.0	64.0	52.7	46.0	62.6

Reference: NOAA, Lindsay weather station, 9.0 miles SE of Exeter, 30 year Averages from 1971-2000



2.3 Land Use

The Land Use Element of the City's General Plan depicts the Urban Development Boundary Line and the Urban Area Boundary Line for the community. This map is included in Appendix B. In 2005 the City adopted the Southwest Exeter Specific Plan which redefined the Urban Development Boundary Line. A map showing the updates to the General Plan, based on the Southwest Exeter Specific Plan and other growth areas, is included in Appendix C and is referred to as the Growth Constraints Map.

It is evident from the inspection of the Land Use Element from the 2020 General Plan, the 2025 Southwest Specific Plan and other growth areas that:

- a) There are only 60 acres inside the 10-year annexation line.
- b) The developable area within the adopted urban development boundary, approximately 425 acres, can accommodate growth for another ten years.
- c) With limitations still persistent with respect to agricultural preserves, the location of development within the urban area boundary line is difficult to predict.

In view of the above, the Water System Master Plan will be designed to:

- a) Serve future growth to the Southwest within the existing City Limits
- b) Serve future growth to the Northwest within the existing City Limits.
- c) Serve future growth within the "in-fill" area within the existing City Limits.
- d) Serve the City to 2020 and accommodate approximately 12,450 people.

2.4 Projected Population

Based on the Southwest Specific Plan and other growth areas in the community, the following numbers were projected by the City in 2005:

Table 2.4-1			Table 2.4-2	
City Developed Population Projections			City Developed Population Projections	
Year	Population (1.88% growth rate)	Population (2.88% growth rate)	Actual Population (US Census Bureau)*	2010 Projections (1.88% growth rate)
2000	9,168	9,168	9,185	-
2001	9,340	9,432	9,278	-
2002	9,516	9,704	9,424	-
2003	9,695	9,983	9,600	-
2004	9,877	10,271	9,681	-
2005	10,063	10,566	9,788	-
2006	10,252	10,871	9,904	-
2007	10,445	11,184	9,873	-
2008	10,641	11,506	9,875	-
2009	10,841	11,837	9,973	-
2010	11,045	12,178	10,334	-
2011	11,253	12,529	-	10,528
2012	11,464	12,890	-	10,726
2013	11,680	13,261	-	10,928
2014	11,899	13,643	-	11,133
2015	12,123	14,036	-	11,343
2016	12,351	14,440	-	11,556
2017	12,583	14,856	-	11,773
2018	12,820	15,284	-	11,994
2019	13,061	15,724	-	12,220
2020	13,306	16,177	-	12,450
2021	13,556	16,643	-	12,684
2022	13,811	17,122	-	12,922
2023	14,071	17,615	-	13,165
2024	14,335	18,123	-	13,413
2025	14,605	18,645	-	13,665
2026	14,879	19,182	-	13,922
2027	15,159	19,734	-	14,183
2028	15,444	20,302	-	14,450
2029	15,734	20,887	-	14,722
2030	16,030	21,489	-	14,988
2035	17,595	24,766	-	16,462
2040	19,312	28,544	-	18,069

* Reference: US Census Bureau Data based on 2009 Population Estimates Data Set, 04/06/2009, Populations for 2000 & 2010 from U.S. Census Bureau Counts during those respective years.

The population in 2009 was 9,973 showing a slower rate of growth compared to the projected numbers from the 2005 Southwest Specific plan (See Table 2.4-1). In December of 2007, the US economy slid into a recession altering the value of homes and ultimately the projected growth rates of the area. For the 10-year period between the years 2000 and 2009, Exeter's estimated population growth rate has not exceeded a growth rate of 1.88%. Additionally, if you take the actual census populations from 2000 and 2010, you find the average growth rate of 1.18% over the ten year

period. For the purposes of this report and future planning, we conservatively estimate the population growth using the lower previously projected growth rate starting at the census population count from 2010. (See Table 2.4-2) [Checklist #11, §10631(a)]

2.5 Service Area Boundaries

The City of Exeter's water system serves only the incorporated area of the City. The City does not sell water to any other agencies nor to any water users outside the City's corporate limits. (See Figure 2.5-1) [Checklist #8, §10631(a)]

2.6 Service Area Demographics

The City provides water to the residents living and business operating within the City's corporate limits. A breakdown of the City of Exeter's demographics is provided below. [Checklist #12, §10631(a)]

CA - Exeter city

Population

Total Population	10,334
------------------	--------

Housing Status

(in housing units unless noted)

Total	3,600
Occupied	3,378
Owner-occupied	2,036
Population in owner-occupied (number of individuals)	6,111
Renter-occupied	1,342
Population in renter-occupied (number of individuals)	4,150
Households with individuals under 18	1,394
Vacant	222
Vacant: for rent	91
Vacant: for sale	71
Vacant: for seasonal/recreational/occasional use	10

Population by Sex/Age

Male	5,020
Female	5,314
Under 18	3,285
18 & over	7,049
20 - 24	720
25 - 34	1,353
35 - 49	1,846
50 - 64	1,642
65 & over	1,188

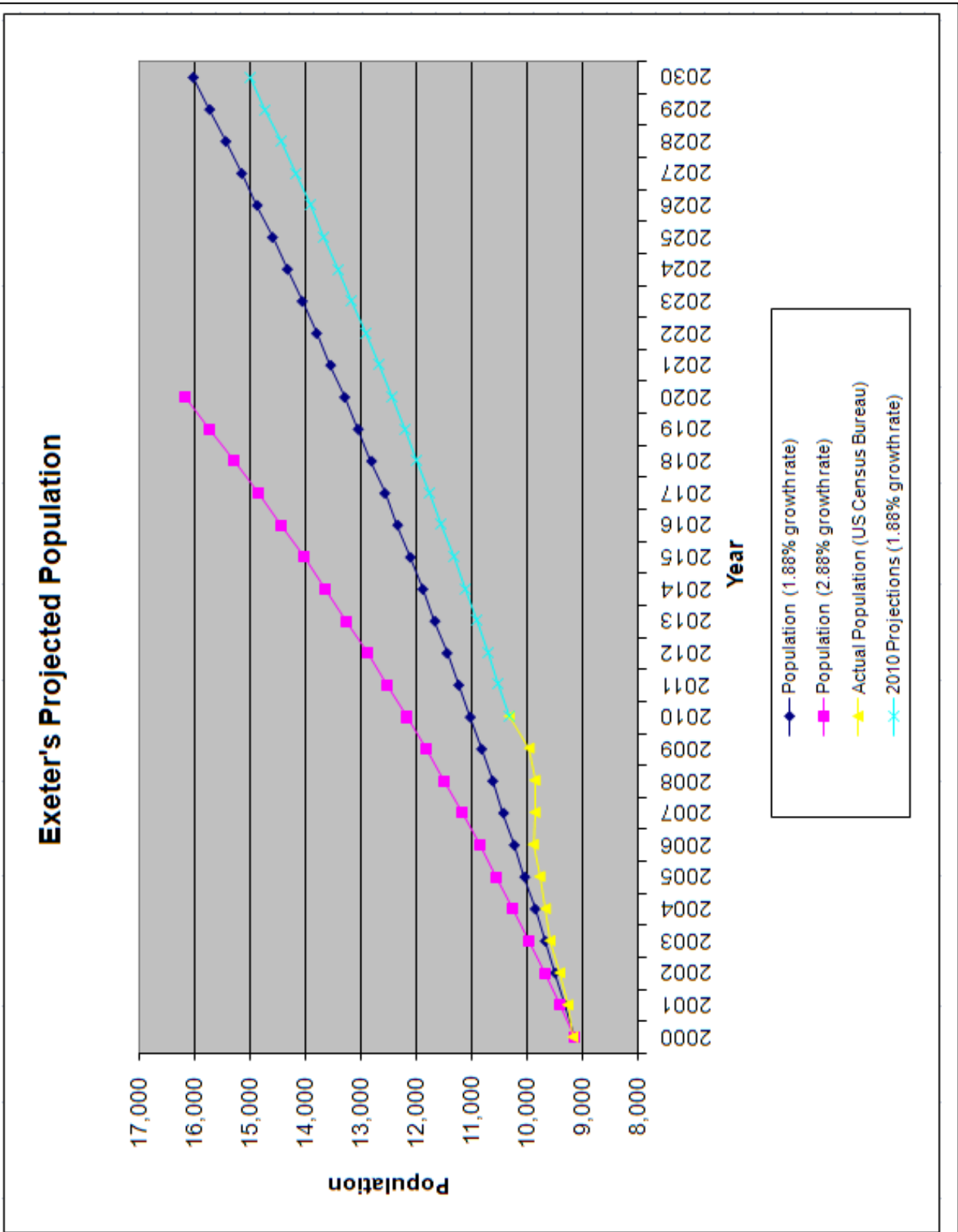
Population by Ethnicity

Hispanic or Latino	4,703
Non Hispanic or Latino	5,631

Population by Race

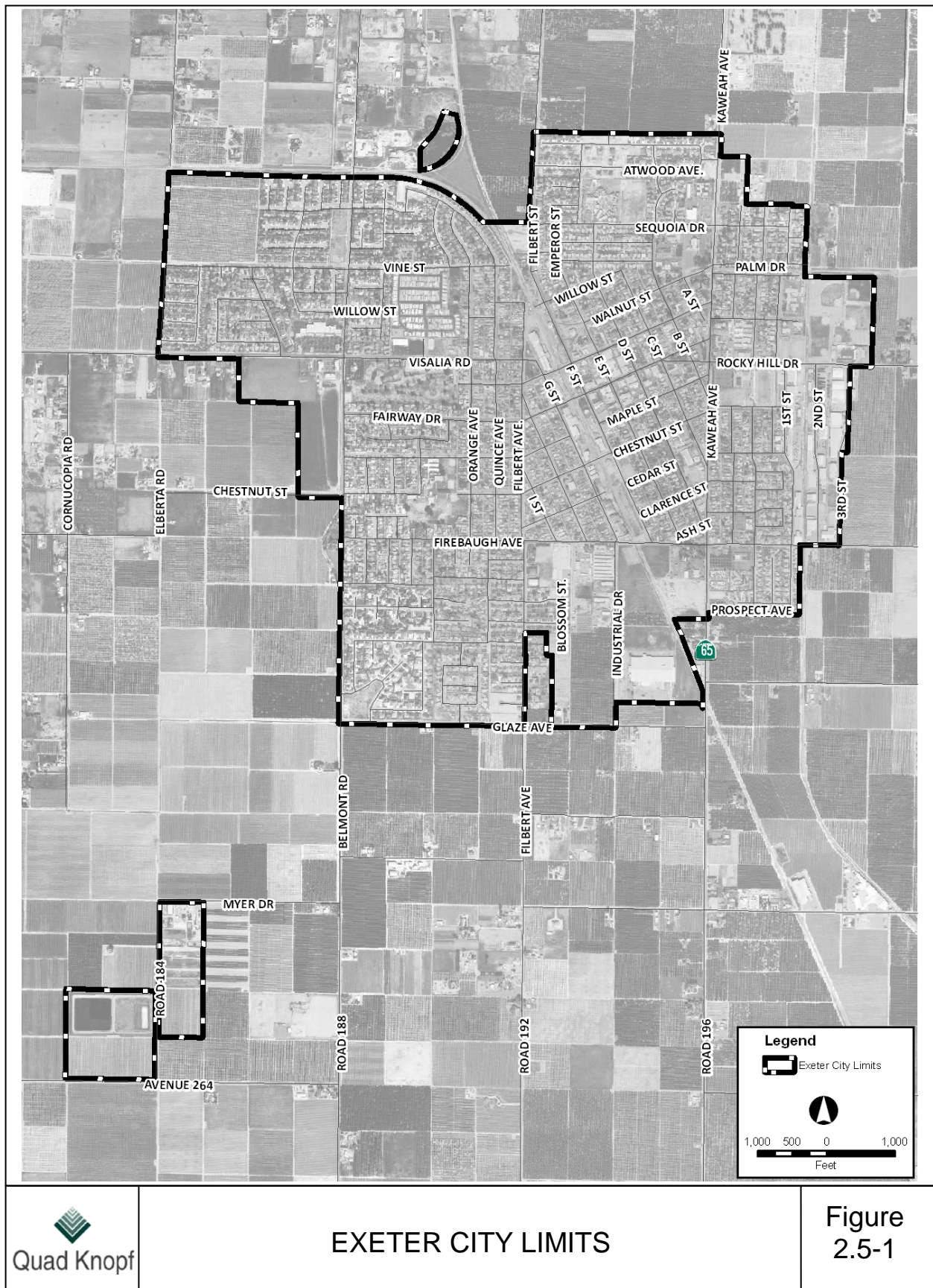
White	7,150
African American	67
Asian	138
AIAN	171
NHPI	8
Other	2,416
Identified by two or more	384

Reference: US Census Bureau 2010 Interactive Population Map. <http://2010.census.gov> (Please note that the federal data appears to have a discrepancy between the total population and the populations listed for owner-occupied and renter-occupied. The data suggests a population of 73 homeless)



POPULATION PROJECTIONS, 2000-2030

Figure 2.4-1



CHAPTER THREE – WATER SUPPLY

LAW

10631(b). Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a)... Provide:

- (1) A copy of any groundwater management plan adopted by the urban water supplier.*
- (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater... information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted ...and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.*
- (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years.*
- (4) A detailed description and analysis of the amount and location of groundwater that is protected to be pumped by the urban water supplier.*

3.1 Water Supply System

3.1.1 WATER SOURCES

The City currently utilizes local groundwater as its sole source of water supply. No natural surface water sources exist. Some private surface water sources, namely irrigation district canals, pass through the City, but are not intended for urban use. Irrigation canals are dedicated for agricultural uses. Currently, the City does not utilize recycled water and storm water as water sources. Desalinated seawater or brackish ground water are not viable water source options. [Checklist #14, §10631(b)]

3.1.2 SYSTEM FACILITIES

The City's municipal water system extracts its water supply from underground aquifers utilizing eight active groundwater wells within the City (Figure 3.1-1). The pumping capacities of the City wells are shown on Table 3.1-1. The City's distribution system consists of a grid work of over forty-three miles of mains whose sizes range from six (6) inches to twelve (12) inches in diameter. Due largely to a major pipe replacement project in 2004, the City's four (4) inch service water mains are now a minimum of six (6) and eight (8) inch diameter C-900 PVC pipes.

3.1.3 SYSTEM OPERATION

The largest storage facility is the 100,000 gallon elevated storage tank located at the intersection of Kaweah Avenue and Pine Avenue. Well pumps are controlled by pressure switches that regulate the "on/off" status of the pumps. These pressure settings were developed by the City staff for

turning the pumps on and off to maintain an average City-wide pressure during varying demands. The low settings will turn the pumps on to maintain a constant safe operating pressure throughout the system, while the high settings will turn the pumps off to prevent high pressures from damaging distribution mains, their appurtenances, and plumbing fixtures at customers' residences and offices. The wells are regulated by the RUGID computer at the elevated storage tank site. The trigger for which a well will be pumping is determined by the water level in the storage tank. The RUGID computer is currently programmed to use Well E12W first and E11W last. During the winter months, water demand is low and the City typically operates six wells. During summer months, additional wells are turned on to help meet increased demand. Well E6W is primarily a peak demand, standby, production well. Since well E6W has a history of chemical contamination from DBCP, public notification is required when used.

3.2 Water Storage

The system's pressure regulation and storage needs are provided by a 100,000-gallon elevated steel tank located at Pine and Kaweah Avenues, in the central area of the City. In addition to the elevated storage tank, three hydropneumatic tanks (located at wells E11W, E12W and E13W) provide a volume of 5,000 gallons, 5,430 gallons, and 5,000 gallons respectively.

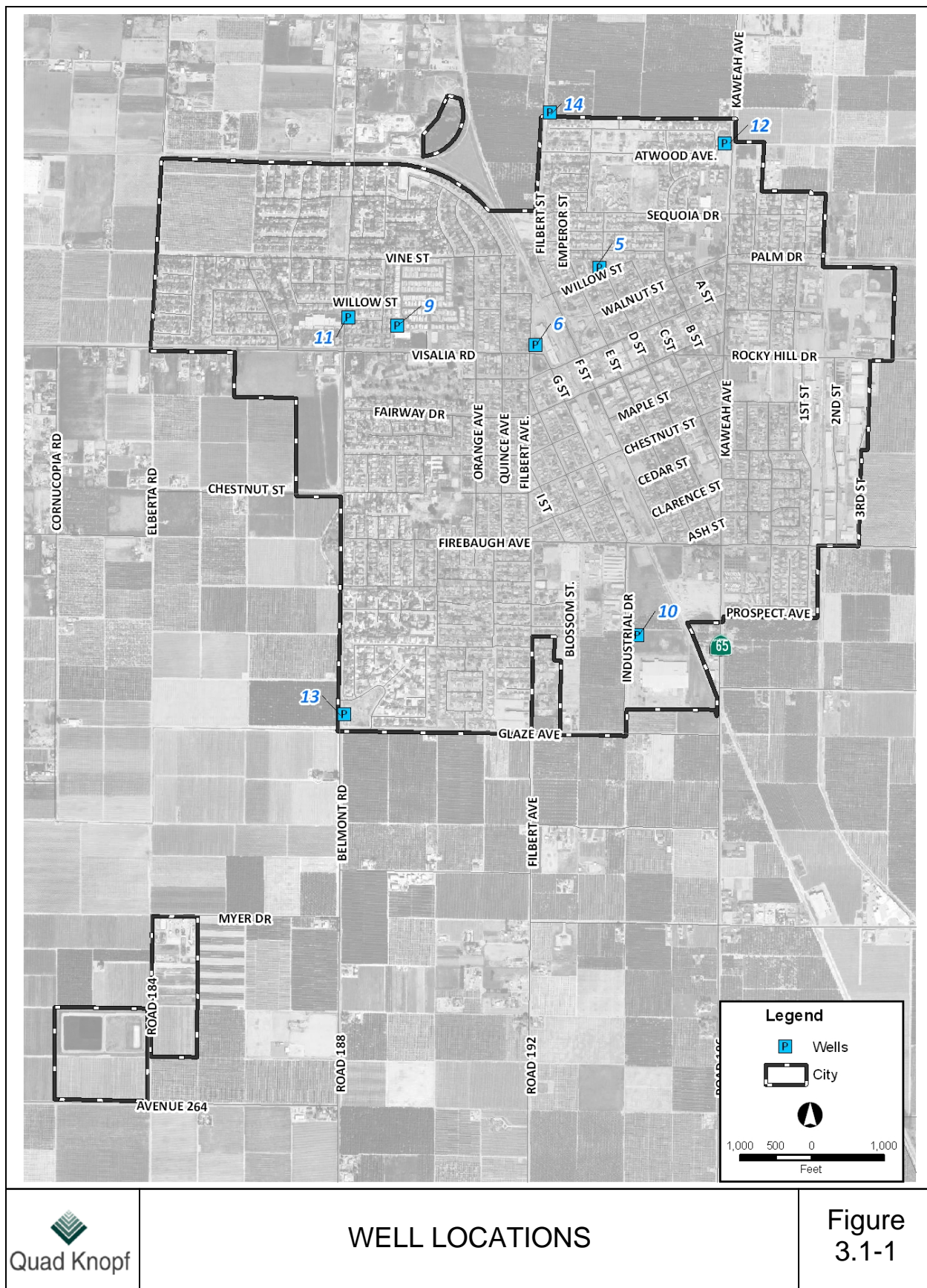
3.3 Groundwater Basin

The groundwater subbasin underlying the City is the Tulare Lake Basin, which is part of the Tulare Lake Hydrologic Region (Figure 3.3-1). This region contains multiple interconnected subbasins that transmit, filter, and store water: the Kings, Kern, Kaweah, Tulare Lake, Tule, Westside, and Pleasant Valley subbasins. The City of Exeter is located within the Kaweah subbasin.

The Tulare Lake Basin is not an adjudicated groundwater basin, as defined by the California Water Plan Update, Bulletin 160-98, Figure 3-28 on page 3-54 and Table 3-16 page 3-55. [Checklist #17, §10631(b)(2)]

The California Water Plan Update, Bulletin 160-98 page 3-50, Table 3-15, lists the 1995 overdraft for the Tulare Lake Hydrologic Region at 820 thousand acre feet (taf). As shown in Table 3-15, groundwater overdraft is expected to decline to 670 taf during 2020. [Checklist #19, 10631(b)(2)]

During dry periods, water levels in the subbasins may decline. However, during wet periods, most of them recover.



**Table 3.1-1
Water Supply Wells**

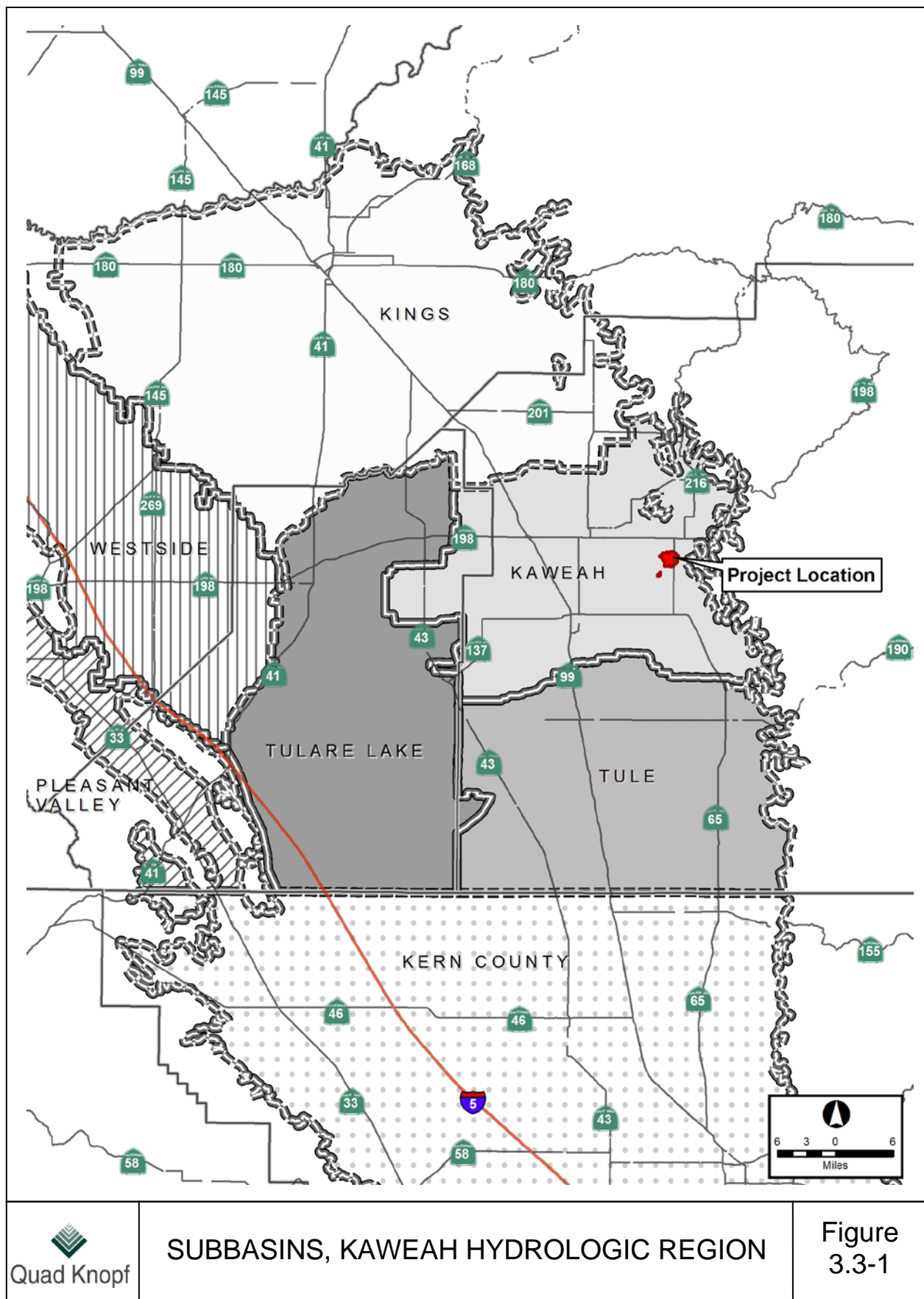
Well No.	Location	H.P.	Well Capacity	Depth (ft)	Water Level		Back-up Power Supply
			(gpm)		Static (ft)	Pumping (ft)	
5*	Willow Street east of D Street	75	1,183	634	-	-	None
6*	Intersection of G Street and Palm Street in a park	75	1,130	420	62	78.3	None
9	West of Albert Ave and North of Visalia Rd.	75	794	296	89.4	100.2	Diesel Generator
10	East side of Industrial Dr, midway between Firebaugh Ave. and Glaze Ave.	125	1,452	430	84.9	94	Propane Generator
11	West of Belmont Ave. and north of Visalia Rd.	75	1,051	430	79	105.8	Propane Generator
12	West side of Highway 65 at northern boundary of City in northeaster part of the City.	100	250	620	108	327.8	None
13	Near the Intersection of Glaze Ave. and Belmont St.	150	1,500	580	83	106.3	Diesel Generator
14	Near the Intersection of Atwood Ave. and N Filbert Road	100	550	555	78	315	None
Total	(all wells)		7,910				
Total	(w/o best producing well – w/o E13W)		6,410	Avg. Well Depth (ft)	Avg. Static Level (ft)	Avg. Pumping Level (ft)	
Total	(w/o Public Notification needed – w/o E5W & E6W)		5,597				
Total	(w/o best producing well and Public Notification – w/o E5W, E6W, & E13W)		4,097	495	83	161	

Reference: Table 4-1, Historical Well Production, and Table 4-2, Well Capacities and Characteristics, of the Exeter Water System Master Plan, September 2008.

***NOTES:**

Well No 5 is currently inactive.

Well No 6 is currently used for a backup water supply.



3.3.1 BASIN BOUNDARIES AND CHARACTERISTICS

The City of Exeter is geographically located within the Kaweah Subbasin which is located in the southern portion of the San Joaquin Valley Groundwater Basin. The southern portion of the valley is internally drained by the Kings, Kaweah, and Tule Rivers that flow into the Tulare drainage basin.

The Kaweah Subbasin lies between the Kings Groundwater Subbasin on the north, the Tule Groundwater Subbasin on the south, crystalline bedrock of the Sierra Nevada foothills on the east, and the Kings River Conservation District to the west. The subbasin generally comprises lands in the Kaweah Delta Water Conservation District. Major rivers and streams in the subbasin include the Kaweah and St. Johns Rivers. The Kaweah River is the primary source of recharge to the area. Average annual precipitation is seven to thirteen inches, increasing eastward.

The total storage capacity of the Kaweah Subbasin is estimated to be 15,400,000 acre-feet to a depth of 300 feet and 107,000,000 acre-feet to the base of fresh groundwater. These calculations were calculated using an estimated specific yield of 10.8 percent and water levels collected by DWR and cooperators. These same calculations give an estimate amount of subbasin groundwater supply in 1995 to be 11,600,000 acre-feet of groundwater to a depth of 300 feet.¹

The subbasin information provided above was derived from California's Groundwater Bulletin 118 dated 02/27/2004. The Bulletin was prepared by the State Department of Water Resources and is provided in Appendix D for further reference. [Checklist #16, §10631(b)(2)]

3.3.2 GROUNDWATER MANAGEMENT PLANS

The City of Exeter is located within the Kaweah subbasin. Generally, the groundwater within this subbasin is managed by the Kaweah Delta Water Conservation District (District). The District has adopted a Groundwater Management Plan (Plan) for the subbasin. Each year the District prepares an annual report on the Plan. The latest report is the 2008 Annual GWMP Report and is included in Appendix E. This Plan pertains to the geographic region that surrounds the City of Exeter. Although the District does not regulate groundwater within the City limits of Exeter, the District's Plan is considered when the City evaluates plan affecting local groundwater. [Checklist #15, §10631(b)(1)]

3.3.3 GROUNDWATER MANAGEMENT ACTIVITIES

Groundwater management activities within the Kaweah Subbasin are conducted and coordinated by a number of agencies. The main agency that coordinates with the various groups that affect groundwater in the area is the Kaweah Delta Water Conservation District. The County of Tulare's General Plan update, the Water Conservation District and City of Visalia's groundwater modeling projects, the 2008 Annual Groundwater Management Plan Meeting are all activities that demonstrate coordinated planning and management of groundwater resources in the Kaweah Basin.

¹ California's Groundwater Bulletin 118 – Appendix D

Other groups that affect groundwater levels and usage in the Exeter area include Consolidated People's Ditch Company (People's) and Exeter Irrigation District (EID). Both groups own, maintain and operate irrigation networks near and within the City of Exeter. The EID's facilities within the City boundaries consist of a pipe network. Since it is a closed system, there is no direct exchange of waters between the City and the EID. However, People's does operate open canals within the City limits and accepts an agreed amount of municipal storm water. The City enjoys a close and cooperative relationship with both of these groups.

3.3.4 AGREEMENT WITH LOCAL IRRIGATION GROUPS

The City of Exeter (City) currently has a surface water agreement with the Consolidated People's Ditch Company (People's). The City is allowed to discharge a limited amount of storm water into the People's ditch network in exchange for a fee to cover maintenance. People's have several open water networks that within the City's boundaries. There are no formal agreements regarding surface water between the City and the Exeter Irrigation District (EID). The EID has only closed pipe systems that run through the City's boundary.

3.3.5 CITY SUPPLY WELLS

The City currently has six active water supply wells and two standbys. Each well has a vertical turbine pump; individual pump output varies from a low of 250 gallons per minute (gpm) to a high of 1,500+gpm. The City has a total of eight wells (E5W, E6W, E9W, E10W, E11W, E12W, E13W, and E14W) which are located throughout the City (Table 3.1-1). The use of two of the wells (E5W and E6W) requires public notification because of a history of chemical contamination from Dibromochloropropane (DBCP). Well E5W has been inactive for many years and E6W is used only during the peak water usage period in the summer.

The eight total wells have a total supply capacity of 7910gpm. The total supply capacity without requiring public notification, meaning the removal of wells E5W and E6W from the total, is 5597gpm. The firm capacity, which is defined as the total capacity less one of the largest wells out of service (E13W), is approximately 6410gpm. The firm capacity without requiring public notification is 4097gpm. The City's water system has no current interconnections to any other water system.

3.3.6 GROUNDWATER LEVELS

The City of Exeter's overall static water level varies in different areas of the City, but presently ranges from around 60 to 100 feet (Table 3.1-1). This compares favorably to the historic water levels. The depth to groundwater in the late 1960's was approximately 80 feet.

Groundwater levels over the entire Kaweah Subbasin are monitored by the Department of Water Resources (DWR). Changes in groundwater levels are based on annual water level measurements by DWR and cooperators. Water level changes were evaluated by Quarter Township and computed through a custom DWR computer program using geostatistics (kriging). On average, the subbasin water level has declined about 12 feet from 1970 through 2000. The period from 1970 through 1978 showed steep declines totaling about 25 feet. The ten-year period

from 1978 to 1988 saw stabilization and rebound of about 50 feet, bringing water levels above the 1970 water level by 25 feet. 1988 through 1995 again showed steep declines, bottoming out in 1995 at nearly 35 feet below the 1970 level. Water levels then rose about 22 feet from 1996 to 2000, bringing water levels to approximately 12 feet below 1970 levels.²

3.4 Water Supply Projections

In determining the adequacy of water supply facilities, the source must be large enough to meet varying water demand conditions, as well as provide sufficient water during potential emergencies such as power outages and natural disasters. There are no currently planned future water supply programs other than the continued development of the City's groundwater supply. Groundwater has been a consistent and reliable source of water throughout the recorded history on the area. The level of water supply is anticipated to be consistent with the values shown on Figure 3.4-1. [Checklist #52, §10634] There is no need for, and there are no opportunities for, surface water treatment facilities. [Checklist #30, §10631(h)]

3.4.1 NORMAL PRODUCTION CAPACITY

In accordance with industry standard practices and the California Department of Health Services (DHS) criteria for "Adequate Source Capacity" regarding water supply, the source should be sized to serve the Maximum Day Demand (MDD). On the day of maximum demand, it is desirable to maintain a water supply rate equal to the MDD rate. For the purposes of analysis, the most recent average per capita consumption rate of 235gpcd³ based on the calculations for a Base Daily Per Capita Water Use for a ten to fifteen year period. Water required for peak hour demands or for fireflows can come from storage or additional pumping.

3.4.2 STANDBY PRODUCTION CAPACITY

Standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be out of service during MDD conditions due to equipment malfunction, for servicing, or for water quality concerns. The DHS criteria recommend calculating the system capacity with the largest well being out of service. To mitigate the potential impact of lost production capabilities, the City should thus have wells with a capacity of 1,500gpm (E13W) in surplus of MDD demand.

Using the DHS recommended calculations and the highest flow rates of the past 5 years; the City's MDD was approximately 2,740gpm in 2007.⁴ Additionally, Fire Flow Requirements (FFR) add a demand of 1,500gpm. The total MDD with FFR is 4,240gpm. The current supply availability of 5,597gpm⁵ is able to handle these demands. Although the recommended supply availability considers the largest well being out of service and drops supply to only 4,097gpm, in the event of a major fire the City plans to activate back up well, E6W. This brings the available

² California's Groundwater Bulletin 118 – Appendix D

³ Historical Water Production, Table 5.1-4

⁴ Calculated from Historical Water Production, Table 5.1-1; Calculations shown in Section 5.1.1

⁵ Water Supply Wells, Table 3.1-1

supply to 5,227gpm and therefore exceeds the design demands of the system running at its peak while addressing a major fire at the same time.

3.4.3 FUTURE GROUNDWATER SUPPLY CAPACITY

An adequate source of supply for the City will consist of groundwater wells with a combined production capacity that continues to meet the MDD, in addition to a standby well production capacity of 1500gpm. The projected yearly water supply through the planning horizon of 2040 is shown in Table 3.4-1 and graphically in Figure 3.4-1.

The City will place in service additional in-City wells as required to meet MDD. The average production capacity of the wells in operation is roughly 930gpm. For the purposes of projection and planning, we assume any additional well will provide equal to or exceeding 930gpm of capacity.

The existing water supply currently meets the total water demand, MDD plus FFR. The need for additional service wells are not anticipated until 2020, 2032 as shown on Figure 3.4-1. [Checklist #13, §10631(b)]

Table 3.4-1
Current and Projected Maximum Daily Water Demands and
Water Supply Capacity Needs, gallons per minute (gpm)
[Checklist #21, §10631(b)(4)]

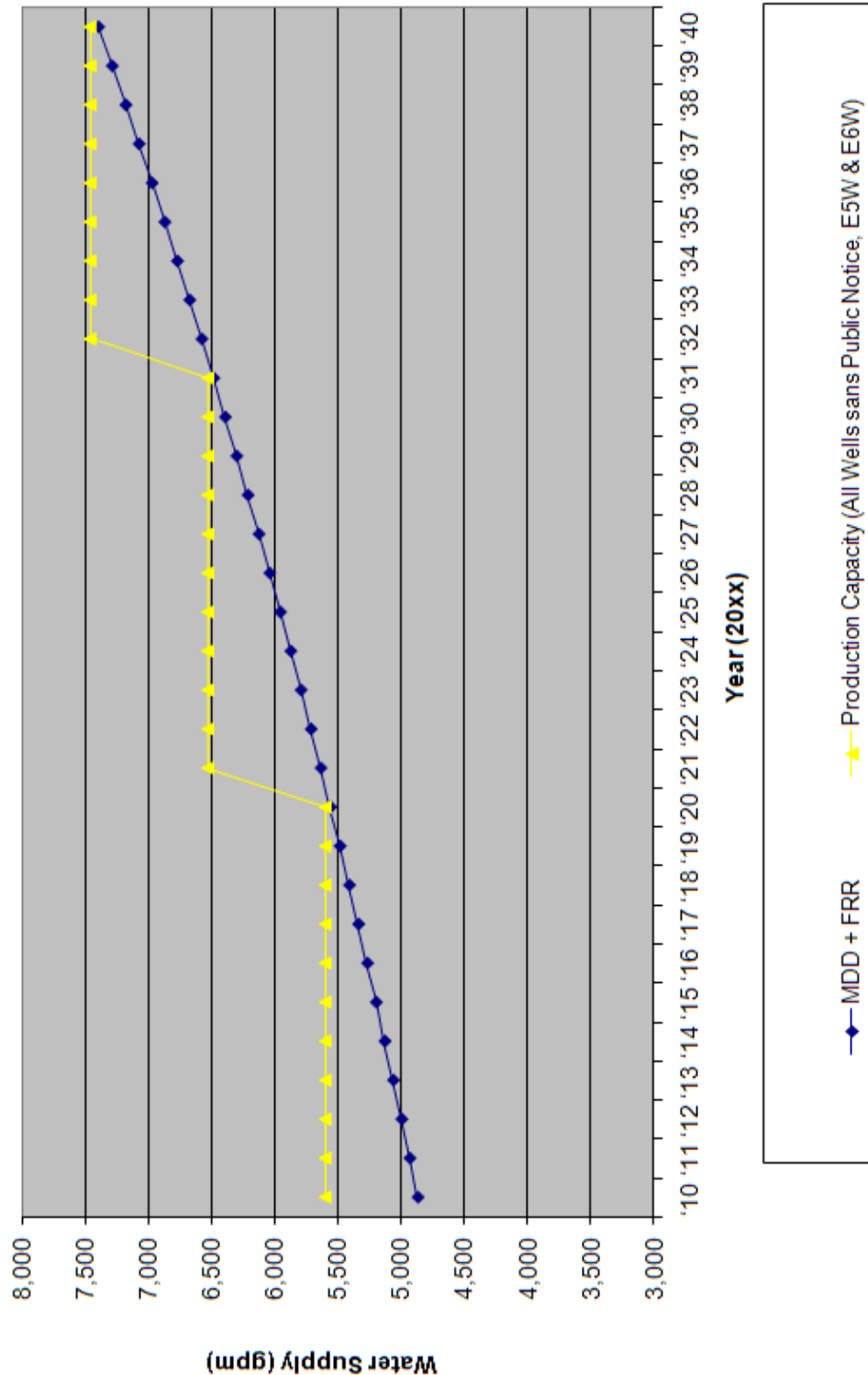
	Years (20xx)									
	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
Demand ⁶ w/ FRR ⁷	4,936	5,001	5,067	5,134	5,202	5,272	5,343	5,415	5,488	5,563
Production Capacity ⁸	5,597	5,597	5,597	5,597	5,597	5,597	5,597	5,597	5,597	5,597
	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30
Demand w/ FRR	5,640	5,718	5,797	5,878	5,960	6,044	6,129	6,216	6,305	6,395
Production Capacity	6,527	6,527	6,527	6,527	6,527	6,527	6,527	6,527	6,527	6,527
	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40
Demand w/ FRR	6,487	6,581	6,677	6,774	6,873	6,974	7,077	7,182	7,289	7,398
Production Capacity	6,527	7,457	7,457	7,457	7,457	7,457	7,457	7,457	7,457	7,457

⁶ Demand = Maximum Daily Demand

⁷ FFR = Fire Flow Requirement, 1500 gpm

⁸ Capacity = Total well capacity w/o requiring public notice (Wells 5 & 6 excluded) Anticipates adding future wells.

Water Supply - Demand vs. Capacity



EXETER WATER SUPPLY DEMAND AND CAPACITY QUANTITIES

Figure
3.4-1

CHAPTER FOUR – RELIABILITY PLANNING

LAW

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.

10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

10631 (c) Provide data for each of the following: (1) An average water year, (2) A single dry water year, (3) Multiple dry water years.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplied:

- (a) Stages of action to be undertaken by the urban water supplier in response to water supply, and an outline of specific water supply conditions which are applicable to each stage.*
- (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply*
- (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*
- (d) Additional mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*
- (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.*
- (f) Penalties or charges for excessive use, where applicable.*
- (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

4.1 Water Supply Reliability

Two aspects of supply reliability are considered for both near-term needs (present to 2030) and long term needs (beyond 2030). The first relates to emergency reliability needs and is primarily a function of the availability and adequacy of supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe dry periods. [Checklist #53, §10635(a)]

4.1.1 STANDBY PRODUCTION

As described in the previous chapter, standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be out of service during maximum day demand conditions due to equipment malfunction, servicing, or water quality concerns.

The California Department of Health Services (DHS) criteria recommends counting the capacity of the largest well as out of service. Well 13 has the largest capacity producing 1,500 gallons per minute (gpm). To mitigate the potential impact of lost production capabilities, the City should thus have wells with a capacity of 1,500 gpm in surplus of the maximum daily demand (MDD) requirements.

Using the DHS recommended calculations and the highest flow rates of the past 5 years; the City's MDD was approximately 2,740gpm (3,946 kgpd) in 2007.⁶ Additionally, Fire Flow Requirements (FFR) add a demand of 1,500gpm. The total MDD with FFR is 4,240gpm. The current supply availability of 5,597gpm⁷ is able to handle these demands. Although the recommended supply availability considers the largest well being out of service and drops supply to only 4,097gpm, in the event of a major fire the City plans to activate back up well, E6W. This brings the available supply to 5,227gpm and, therefore, exceeds the design demands of the system running at its peak while addressing a major fire at the same time.

Currently, the City's water supply is adequate to meet the immediate demands of the community, but the City's total available water capacity will be insufficient to meet the State recommended design capacities for the community in the future. The recommended design capacity factors in the possibility of a large fire and the loss of the largest producing well. The City needs to increase the water supply capacity to include redundancy provisions for standby production and source reliability.

⁶ Calculated from Historical Water Production, Table 5.1-1; Calculations shown in Section 5.1.1

⁷ Water Supply Wells, Table 3.1-1

4.1.2 CLIMATE-RELATED RELIABILITY CONCERNS

Not all hydrologic dry years lead to water supply shortages and groundwater overdraft. The annual quantity of groundwater available to the City does not vary significantly in relation to wet or dry years. During extended dry periods, groundwater levels generally decline, and will require more aggressive demand management practices. The reliability of the City's water supply, however, has remained consistent despite seasonal or climatic changes.

The City of Exeter has never suffered a severe water shortage. The nature of the groundwater supply is such that a sudden shortage is extremely unlikely. Any shortage that may be experienced will be due to failure to plan for increased demand due to population and industrial growth, or from catastrophic well or equipment failure.

4.2 Groundwater Quality Reliability Concerns

LAW

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.

4.2.1 EXISTING WATER QUALITY REGULATIONS

In 1974, the Safe Drinking Water Act (SDWA) gave the United States Environmental Protection Agency (EPA) the authorization to set drinking water standards for contaminants in the drinking water supplies. Under the provisions of the SDWA, the California Department of Health Services (DHS) (recently renamed the Department of Public Health) has the primary enforcement responsibility. Appendix G includes a summary of the current (2007) maximum contaminant levels and regulatory dates enforced by DHS.

4.2.2 EXISTING LOCAL GROUNDWATER QUALITY

Historically the water quality in Exeter's wells has been very good and has consistently met drinking water standards. Water samples collected on May 31, 2007 are used to provide a snapshot of Exeter's water quality. Five wells, E6W, E9W, E10W, E11W, and E12W were sampled. The general water quality is good with pH values from 7.6 to 8.3 and specific conductance values ranging from 450 to 680. The sample from E12W is classified as moderately hard, all the other samples were in the hard or very hard classifications. Heavy metals were detected occasionally, i.e. iron and copper in E6W and barium in E6W, E9W and E10W (all below MCLs). Arsenic was detected in wells E11W and E12W. The arsenic concentrations, 2.5 parts per billion (ppb) in E11W and 3.5 ppb in E12W, are well below the arsenic standard of 10 ppb.⁸

⁸ Existing Groundwater quality information derived from the 2008 Exeter Water System Master Plan

In 1994 levels of Dibromochloropropane (DBCP), a pesticide used to combat nematodes in agriculture in years past, began showing up in concentrations exceeding the maximum contaminant level (MCL) in well E10W. In 1995 the concentrations dropped below the MCL and E10W was returned to service. In 2000, concentrations of DBCP in well E9W exceeded the MCL. In August 2001 the levels dropped below the MCL. Then, in 2003, well E6W showed concentrations of DBCP exceeding the MCL. In the past, E6W has been used to meet summer peak demands, but only after public notification. However, with the addition of Well E13W, the use of E6W has been unnecessary. With sufficient availability of wells with good water quality, there are no projected supply changes due to water quality.

The water quality report for 2006 is attached in Appendix H of this report. Additional information can be found in the Water Permit No. 03-12-05P-005, written by the Department of Health Services in 2005. A copy of this report is on file with the City of Exeter Department of Public Works. Some recently enacted rules are included in the following subsections.

4.2.3 ARSENIC RULE

Arsenic is a constituent of many foods such as meat, fish, poultry, grain and cereals. Excessive amounts of arsenic can cause acute gastrointestinal damage and cardiac damage. Starting January 23, 2006, the Arsenic Federal MCL was set at 10 ppb. The City has recently tested the Arsenic levels and is below the new Federal mandated level.

4.2.4 STAGE 1 DISINFECTION/DISINFECTION BY-PRODUCTS RULE (D/DBPR)

Due to the City's population surpassing 10,000 persons, Stage 1 Disinfection/Disinfection By-products rule has become effective for the City of Exeter. This rule was enacted in 1998 and became effective in January, 2002. Stage 1 limits are as follows:

Total Trihalomethanes (TTHMs)	- 80 ug/L
Haloacetic Acids (HAAs)	- 60 ug/L
Bromate	- 10 ug/L
Chlorite	- 1.0 mg/L

The following residual disinfectant levels have been established to limit the applied dose of chlorine, chloramines and chlorine dioxide during drinking water treatment:

Chlorine	- 4.0 mg/L
Chloramines	- 4.0 mg/L
Chlorine Dioxide	- 0.8 mg/L

The City has recently tested these levels and is below the Federal mandated level.

4.2.5 STAGE 2 DISINFECTION/DISINFECTION BY-PRODUCTS RULE (D/DBPR)

Stage 2 Disinfection/Disinfection By-products Rule consists of monitoring chloroform at 0.070 mg/L, require public water systems to conduct a yearlong initial

distribution system evaluation to identify monitoring sites with peak DBP levels, require public water systems to comply with 80/60 TTHM/HAA standards at each well site and raise the TTHM/HAA limits to 120/100 temporarily to allow time for utilities to make adjustments to come into compliance with the 80/60 TTHM/HAA standards.

4.2.6 LEAD AND COPPER RULE (LCR)

The objective of the LCR is to minimize the corrosion of lead and copper containing plumbing materials in public water systems by requiring utilities to optimize treatment for corrosion control. The LCR establishes action levels in lieu of MCLs for regulating the levels for both lead and copper in drinking water. The action level for lead was established at 0.015 mg/L and for copper is 1.3 mg/L. An action level is exceeded when greater than 10 percent of the samples collected from the sampling pool contain lead levels above 0.015 mg/L or copper levels above 1.3 mg/L. Once the action levels have been exceeded, an action level is required by the public water system to reduce lead and copper corrosion. The City of Exeter's lead and copper levels were at non-detectable levels in the year 2007, well below the action level.

4.2.7 FUTURE EFFORTS

To reduce water quality problems, future well locations should be undertaken in general accord with the following procedures:

- Employ a qualified hydrogeologist to tentatively locate a site.
- Drill a test well, under the direction of the hydrogeologist, to evaluate well potential for production and to, through sampling and testing, predict water quality and quantity from penetrated aquifers.

4.3 Catastrophic Interruption Concerns

Such concerns have been identified by the Water Code (Section 1063(c)) as involving regional power outages, earthquakes or other disasters. In any such case, the City's water supply system should be capable of providing, as a minimum, the average daily demand (ADD) through emergency power. Emergency power could be in the form of dual power, direct engine driven pumps or engine-generator sets.

The City's existing water system has two propane-powered engine driven pumps, wells E10W and E11W, and two diesel powered engine driven pumps, wells E9W and E13W. With the addition of the standby power at each of these wells, the wells are capable of producing 4,797gpm. The total storage requirements for this scenario are shown in Table 4-3.1. It is evident, with this scenario, that no additional auxiliary power sources will be needed for emergency requirements.

Table 4-3.1
Emergency Water Supply Flow Rates

Year	Average Daily Demand, ADD (gpm)	Capacity with Backup Power Sources (gpm)
2006	1,661	4,797
2007	1,583	4,797
2010	1,686	4,797
2015	1,851	4,797
2020	2,032	4,797
2025	2,230	4,797
2030	2,448	4,797

(1) ADD for 2006 and 2007 are derived from Table 5.1-1

(2) ADD for 2010, 2015, and 2020 are derived from Table 2.4-2 and Section 5.1.1

(3) Capacity values are derived from Table 3.1-1

4.4 Future Water System Planning

4.4.1 FUTURE GROUNDWATER WELLS

Limitations with respect to the development of additional water supply from the underground aquifers in the immediate area of Exeter include those associated with both quality and quantity. DBCP contamination is of concern throughout the community. This contamination concern lessens towards the southerly and westerly portion of the City. Thus, the City is looking to depend upon the southern and western sectors to provide its long-term water supply needs.

4.4.2 FUTURE USE OF SURFACE WATER

Using surface water in terms of developing a long-term water supply are limited. Surface water in the Kaweah River system as well as the Friant-Kern Canal is fully appropriated, primarily by agricultural users. There is, however, the potential for the City to buy surface water rights as individual farmers in the surrounding area take land out of production and convert it to other uses, or wish to sell for some other reason.

There are disadvantages to reliance upon surface water for Exeter's municipal water supply. The Friant-Kern Canal is periodically shut down for maintenance and wells must be relied upon during such shutdown periods. Other surface water supplies may be subject to supply limitations during dry periods. The City's limited financial resources make the acquisition of some types of surface water rights difficult, even if they are available. Surface water treatment facility construction and operation is costly; dependent upon its point of supply, transport to the City's system would involve significant capital investment. In short, long-term reliance upon surface water supply is not considered an approach which should be considered at this time.

Operating a surface water treatment plant would add a few other Federal and State mandated water quality requirements. Those requirements are listed as follows:

- Surface Water Treatment Rule
Monitors turbidity, Giardia lamblia, viruses, Legionella and heterotrophic plate count bacteria in U.S. drinking water.
- Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)
Include filtering of the surface water to reduce levels of Giardia and Cryptosporidium
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
- Filter Backwash Rule

4.4.3 FUTURE PROGRAM PLANNING

As a result of the amendments of the Safe Water Drinking Act, source water protection has become a greater national priority. The amendments require a more comprehensive watershed based prevention approach to be applied to improving and preserving water quality of the public water supply source. The State of California has established a Source Water Assessment and Protection (DWSAP) Program in order to provide guidance to local communities better protect their water resources. The key elements of the program are as follows:

- Delineate the boundaries of the areas providing source water for public water supply systems.
- Inventory of the sources of regulated and certain unregulated contaminants of concern within the delineated areas.
- Determine the vulnerability of each water source to contamination.
- Public education and outreach.

The program could ultimately lead to the development of a comprehensive prevention and protection program that include monitoring.

Current plans for future water programming include monitoring water needs and the installation of new wells as needed. No projected improvements are needed until 2020 per figure 3.4-1.

CHAPTER FIVE – WATER USE

LAW

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (b)(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.

10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

- A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and government; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.*
- B) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.*

5.1 Past, Current, and Projected Water Use

5.1.1 HISTORICAL WATER USE

The City provides potable water service to its residential, commercial, industrial, and institutional customers within the City limits. In 2007, the City produced approximately 831.9 million gallons or 2553 acre-feet (af) which is equivalent to an average 2.28 million gallons per day (mgd) of water servicing a population of approximately 9,873.

The total gallons of water used per year since 1996 is summarized in Table 5.1-1. For a complete summary by year and month see Appendix I. From 1996-2007 the per capita usage varied from a high of 251 gallons per day in 1996 to a low of 217 gallons per day in 1998.

Reflections on how different climatic conditions affect water use can be seen in Tables 5.1-3, 5.1-4, and 5.1-5. These tables reflect water usage during a single dry water year, average water years, and multiple dry water years. [Checklist #22, §10631(c)(1)]

**Table 5.1-1
Historical Water Production**

Year	Population	Total Water Production (G)	Average Flow Per Minute (gpm)	Average Daily Demand (gpd)	Maximum Daily Demand (gpd)	Maximum to Average Day Ratio	Average Per Capita Consumption (gpcd)
1996	8,370	767,360,090	1,460	2,102,356	3,495,338	1.66	251
1997	8,493	776,055,352	1,477	2,126,179	3,319,619	1.56	250
1998	8,618	681,093,700	1,296	1,866,010	3,356,181	1.80	217
1999	8,733	768,144,300	1,461	2,104,505	3,361,442	1.60	241
2000	9,185	769,648,502	1,464	2,108,626	3,339,561	1.58	230
2001	9,278	806,939,800	1,535	2,210,794	3,517,971	1.59	238
2002	9,424	812,679,300	1,546	2,226,519	3,656,013	1.64	236
2003	9,600	826,082,400	1,572	2,263,239	3,835,245	1.69	236
2004	9,681	861,745,156	1,640	2,360,946	3,820,223	1.62	244
2005	9,788	834,656,900	1,588	2,286,731	3,852,329	1.68	234
2006	9,904	873,240,304	1,661	2,392,439	4,028,887	1.68	242
2007	9,873	831,900,510	1,583	2,279,179	3,946,845	1.73	231
Average Flow Ratio:						1.65	

- (1) Population from U.S. Census Data. *2000 population comes from US Census Count, 2001-2007 are based on a 2009 estimate based on 2000 counts.
(2) Total Water Production and Maximum Daily Flow from field data
(3) All other columns are derived from data provided in (1) and (2)

From the previous Chapter 3, Table 3-1.1 depicts the current capacities and characteristics for all eight wells. As shown, the wells can produce a total of 5,597gpm without the use of Well E6W. In 2007, the Average Flow Per Minute was 1,583gpm, which is well under the level of capacity. The maximum daily flow in 2007 was 2,741 gpm that is also under the level of capacity. [Checklist #20, §10631(b)(3)]

It should be noted that the current water levels compare favorably to the historic water levels. The depth to ground water in the late 1960s was approximately 80 feet. Table 3-1.1 shows the overall ground water level averaging 83 feet in depth ground water depth. Five of the seven wells are within 10 feet of 1960 levels and one of the seven wells has a ground water depth of 62 feet.

5.1.2 CURRENT WATER SERVICE CONNECTIONS

The City of Exeter requires metering of all public, domestic, commercial and industrial water connections. Table 5.1-2 summarizes the City's water service connections as of the end of 2007.

Data regarding the distribution of water use among domestic, commercial and small industrial water connections has been estimated for this report by the City Finance and engineering staff. The City's 2007 total water usage is 831.9 MGY (2553 acre feet).

Table 5.1-2
Water Service Connections

	Total
Residential	2,988
Commercial	269
Industrial	19
Total Active Connections⁹	3,276

5.1.3 WATER PEAKING FACTORS

Water peaking factors are significantly valuable in analyzing a water system to determine future water consumption values. The peaking factor is the ratio of the maximum flow to the average daily flow in a water system. The peaking factor is a concept used in the drinking water industry for nearly 100 years.

Definitions for the peaking factors relevant to this analysis are as follows.

AVERAGE DAILY DEMAND (ADD)

The Average Daily Demand is typically computed using historical water usage.

For this analysis, the projected ADD was determined using the most current average per capita consumption of water as shown in Table 5.1-1.

MAXIMUM DAILY DEMAND (MDD)

The maximum day demand (MDD) represents the maximum consumption during any one day of the year. The maximum day peaking factor is expressed as a ratio of the maximum day demand divided by the ADD. The ratio generally ranges from 1.2 for very large water systems to 3.0 or even higher for specific small systems.

For the City of Exeter, the single day with the maximum water consumption normally occurs during the hottest month of the year. In general, the maximum day flow is 2.0 or 2.5 times greater than the average annual demand. The historical MDD found in Table 5.1-1 shows the average flow ratio from 1996 to 2007 to be 1.65. For this study, a conservative flow ratio value of 2.0 is used to determine future MDD values.

$$\text{Maximum Day Demand} = 2.0 \times \text{Average Day Demand}$$

⁹ Exeter 2008 Water System Master Plan – All connections are metered

PEAK HOUR DEMAND (PHD)

The maximum flow rate delivered by the distribution system on any single hour during the year corresponds to the peak hour water demand. The peak hour demand (PHD) is the peak hour water demand divided by the average daily demand (ADD). Peak hour demands typically occur during the morning hours. In the absence of historical peak hour water flows, a peak hour demand of 3.0 to 3.5 may be used. For this study a PHD of 3.0 is used.

$$\text{Peak Hour Demand} = 3.0 \times \text{Average Day Demand}$$

The values for the ADD, PHD and MDD are shown in Table 4-3 (Appendix F) for each year based on the future population projections described in subsection 5.1.5.

5.1.4 PAST, CURRENT, AND PROJECTED PER-CAPITA CONSUMPTION

The per capita consumption rate is used for estimating the City's future water requirements, evaluating the adequacy of the supply source, and determining storage needs. The consumption rate, expressed in gallons per capita per day (gpcd), is applied to the projected population to yield future water requirements. Utilizing the 2010 UWMP Methodologies, the **Base Daily per Capita Water Use** is calculated as **235gpcd**¹⁰. This value represents the consumption rate to be used to estimate future water requirements of the City based on a 10-15 year cycle. As shown in Table 5.1-4, the corresponding **urban water use target** is **188gpcd**¹¹ for year 2020. The **interim base water use target** is **212gpcd**¹² for year 2015. [Checklist #20, §10631(b)(3)]

5.1.5 PROJECTED WATER USE

Based on future trends in population provided by the US Census Bureau and the most recent per capita water consumption rate of 235gpcd, the City's future water requirements are estimated and summarized in Table 5.1-6. In addition to the projected average daily demands (ADD), Table 5.1-6 includes 5 year estimates for MDD, through the planning horizon year of 2040. Based on these projections, it is anticipated that the City's average day and maximum day requirements for 2040 (w/o targeted reductions) will be over 4.2 MGD (2,946 gallons per minute (gpm)) and 8.5 MGD (5,893 gpm), respectively.

¹⁰ Refer to Table 5.1-4.

¹¹ The target urban water use value is determined by determining a 20% reduction in water use for the determined base daily per capita water use over a ten year period. Additionally, this target water usage should also reduce water usage below a 5% reduction in water use for the determined base daily per capita over a five year period. For a numeric representation of the target urban water use, refer to table 5.1-4.

¹² Refer to Table 5.1-5.

Table 5.1-3
Base Daily Per Capita Water Use Calculation (5 year cycle)¹³

Base Years	Service Area Population	Gross Water Use (gallon per day)	Daily Per Capita Water Use (gallon)
2003	9,600	2,263,239	236
2004	9,681	2,360,946	244
2005	9,788	2,286,731	234
2006	9,904	2,392,439	242
2007	9,873	2,279,179	231
Base Daily Per Capita Water Use (5 yr average)			237
95% of Base Daily Per Capita Water Use (5 yr)			
2015 Minimum Daily Per Capita Water Use			225

Table 5.1-4
Calculation of Urban Water Use Target (10 year cycle)¹⁴

Base Years	Service Area Population	Gross Water Use (gallon per day)	Daily Per Capita Water Use (gallon)
1998	8,618	1,866,010	217
1999	8,733	2,104,505	241
2000	9,185	2,108,626	230
2001	9,278	2,210,794	238
2002	9,424	2,226,519	236
2003	9,600	2,263,239	236
2004	9,681	2,360,946	244
2005	9,788	2,286,731	234
2006	9,904	2,392,439	242
2007	9,873	2,279,179	231
Base Daily Per Capita Water Use (10 yr average)			235
2020 Urban Water Use Target (gal/capita/day) = 80% of 10yr			188
2015 Min. Base Daily Per Capita Water Use (See Table 5.1-3) = 95% of			
			5yr
			225

¹³ Use 5 year base period for Water Use to check for legislation required 5% reduction in water use. Most recent year in base period must end no earlier than Dec 31, '07 and no later than Dec 31, '10. This 5-year period also serves as the sampling of multiple dry water years. The single dry water use for Exeter is 2007.

¹⁴ Use 10 year base period for Water Use to check for legislation required 20% reduction in water use. Most recent year in base period must end no earlier than Dec 31, '04 and no later than Dec 31, '10.

**Table 5.1-5
Interim Urban Water Use Target**

Base Daily Per Capita Water Use (10 yr average)	235
2020 Urban Water Use Target (gal/capita/day)	188
Average between Base Water Usage and Target = Interim Urban Water Use Target for 2015	212

**Table 5.1-6
Projected Average and Maximum Daily Demand (ADD & MDD)
Through 2040 (Gallons per Day) w/o target reductions¹⁵**

	Year					
	2015	2020	2025	2030	2035	2040
ADD	2,665,605	2,925,750	3,211,275	3,522,180	3,868,985	4,243,160
MDD	5,331,210	5,851,500	6,422,550	7,044,360	7,737,970	8,486,320

5.2 Expansion Projects

Law

10910.(a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act X shall comply with this part.

10912. For the purpose of this part, the following terms have the following meanings:

10912 (a) "Project" means any of the following:

- (1) A proposed residential development of more than 500 dwelling units.*
- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- (4) A proposed hotel or motel, or both, having more than 500 rooms.*
- (5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,00 square feet of floor area.*
- (6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
- (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

¹⁵ Using projected population growth rate of 1.88% (Figure 2.4-1) and 235 gallons per day per capita consumption without the emergency Fire Flow Requirements (FFR = 1500gpm).

5.2.1 PROJECTED WATER USE

The City has no knowledge regarding any proposed projects of the sizes or water demands defined in the law given the City's size. It is unlikely that such projects will be proposed or built within the 2040 planning horizon. If so proposed, project compliance with Sections 10910 through 10914 will be required.

5.3 Water Shortage Expectations

The water use projections in Table 5.1-6 assume any potential increase in use will be offset by the increased water supply provisions. Without diversified water resources available, during a catastrophic event the City would have to rely on the importation of water from other regions by means of truck or bottled supplies. [Checklist #23, §10631(c)(2)]

5.4 Other Water Uses

The City has no, and does not anticipate having any, water uses other than those already described. The following methods to obtain water are not considered practical or needed by the City at this time. The City will reconsider utilizing these methods in the future.

- Water transfers [Checklist #24, §10631(d)];
- Water sales;
- Saline barriers;
- Desalinated water projects [Checklist #31, §10631(i)];
- Groundwater recharge; and
- Conjunctive use.

CHAPTER SIX – SUPPLY AND DEMAND COMPARISON

LAW

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

6.1 Supply and Demand Comparison

Comparisons of projected supplies and demands are shown in Tables 3.4-1 and 5.1-3 and on Figure 3.4-1. The City currently has the water supply capabilities to meet MDD, Fire flow demand, and to provide standby production capabilities.

As an additional safety measure, the State recommends evaluating the water supply based on the most productive well being inoperable in the event of localized failure of the water system, a regional power outage, or earthquake. The City of Exeter currently has two back up wells available in the event additional water flows are needed due to a major fire. The additional wells provide for more than enough water flow necessary to offset the loss of the City's most productive well.

The State requires a 20-year water supply outlook be provided for planning purposes. This means this 2010 UWMP should extend projections to 2030. For continuity and ease of preparation for future UWMP, projections are extended to 2040 where possible to account for delays in City adoption or State approval.

The projected demands for the planning horizon of 2030, including five-year increments from present until then, are discussed in chapter five. Table 5.1-6 indicated a total maximum demand, required supply capacity, of approximately 3,522,180 gallons per day average (3,946 acre feet per year) will be needed in year 2030.

The projected future demands are conservative and do not differentiate between varying climatic years. Realistically the domestic water use will vary from normal water years during single and multiple dry water years. Although not required, the City of Exeter can implement domestic use demand control measures in order to further protect the water supply resources. See Chapters Seven and Eight.

CHAPTER SEVEN – WATER DEMAND MANAGEMENT MEASURES

LAW

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

- (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following...*
 - (a) Water survey programs for single-family residential and multi-family residential customers.*
 - (b) Residential plumbing retrofit.*
 - (c) System water audits, leak detection, and repair.*
 - (d) Metering with commodity rates for all new connections and retrofit of existing connections.*
 - (e) Large landscape conservation programs and incentives.*
 - (f) High-efficiency washing machine rebate programs.*
 - (g) Public information programs.*
 - (h) School education programs.*
 - (i) Conservation programs for commercial, industrial, and institutional accounts.*
 - (j) Wholesale agency programs.*
 - (k) Conservation pricing.*
 - (l) Water conservation coordinator.*
 - (m) Water waste prohibitions.*
 - (n) Residential ultra-low-flush toilet replacement programs.*

In 1991, a Memorandum of Understanding (MOU) regarding Urban Water Conservation in California formed the California Urban Water Conservation Council (CUWCC). The City is not currently a signatory of the MOU and is therefore not a member of CUWCC.

However, the City realizes the importance of Best Management Practices (BMPs) to ensure a reliable future water supply. The City is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers.

The California Department of Water Resources (DWR) has termed such BMPs as Demand Management Measures (DMMs). Accordingly, this chapter will refer to them as DMMs. [Checklist #26-29, §§10631(f)(1),(3),(4),&(g)]

7.1 DMM 1 – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

This program consists of offering water audits to residential customers. Audit components include reviewing water usage history with the customer, identifying leaks inside and outside, and recommending improvements.

It is recommended that the City initiate a program offering such audits and residential landscape audits. The City should target the largest one to five percent of single-family residential users in 2012 and 2013. A similar program for multi-family residential users will be developed in future years (2014 and 2015). Water bills would be reviewed before and after the audit is conducted to evaluate program effectiveness.

7.2 DMM 2 – Residential Plumbing Retrofit

This program consists of installing physical devices to reduce the amount of water used or to limit the amount of water, which can be served to the customer. In accordance with State Law, low flow fixtures have been required on all new construction since 1978. In addition, State legislation enacted in 1990 requires all new buildings after January 1, 1992 to install Ultra-Low Flush Toilets (ULFT).

Several studies suggest that savings resulting from miscellaneous interior retrofit fixtures can range between 25 and 65 gpd per housing unit. The studies also suggest that installation of retrofit fixtures in older single-family homes tends to produce more savings, while newer multi-family homes tend to produce fewer savings per housing unit.

Beginning in 2013 the City could undertake, in its role as a Redevelopment Agency, a City-subsidized program for residential plumbing retrofits in existing dwelling units. An annual assessment of the short-term and long-term savings from the program should be made.

7.3 DMM 3 – System Water Audits, Leak Detection, and Repair

The City's standard operations and procedures already include provisions for monitoring and maintaining the water system for leaks and other repair needs. These practices have been established prior to the 1970's. These practices include weekly inspections of the system's water well operations and observations of differences in the amounts water extracted and delivered. The effectiveness of this program is based on the comparison of water usage observations.

7.4 DMM 4 – Metering with Commodity Rates for all New Connections

This DMM recommends water meters for all new construction and billing by volume of use. This ensures all new construction will match all existing City connections that are already currently metered. Annually evaluate water production/pressure measurements to assess if any meters need further operational evaluation.

7.5 DMM 5 – Large Landscape Conservation Programs and Incentives

The City adopted the 2010 Water Efficient Landscape Ordinance in accordance with Assembly Bill 325: The Water Conservation in Landscaping Act. This ordinance limits the amount of turf in landscaping, require plant groupings according to water needs, and provide some flexibility to the landscape designer while promoting landscape efficiency. The Parks Superintendent reviews all commercial landscaping plans for compliance prior to permits being issued. The City assists with setting irrigation controller clocks for water efficiency landscape watering.

To ensure that the intent of such regulations is carried out, the applicant for a building permit is required to submit landscape plans for review to the City.

After the approved landscape is installed, it is the responsibility of the Building Department to inspect the project to confirm that the landscaping for the project was installed in accordance with the approved plans. The landscape designer certifies that the project is in compliance with these regulations by signing and submitting a completed certificate of compliance. The Building Department could authorize the deferral of landscape completion for good and valid reasons, subject to the posting of appropriate security with the City.

The City covers xeriscape landscaping within Section 8.3 of the Water Conservation Chapter of the City of Exeter Water System Master Plan. Furthermore, a list of xeriscape plants is provided in Attachment O of the City's Water System Master Plan.

7.6 DMM 6 – High-Efficiency Washing Machine Rebate Program

Rebates sponsored by the private utilities which serve the City is available to City residents who purchase a high-efficiency washing machine. An efficient washing machine can save the user up to \$650 in energy and water costs over the life of the machine. To qualify, the unit must be installed with a water-heating source using natural gas distributed by Southern California Gas Company or electricity distributed by Southern California Edison. Follow the online rebate request instructions.

7.7 DMM 7 – Public Information Programs

This program consists of distributing information to the public through a variety of methods including brochures, school presentations, and web sites. The City will consider in 2012 the modification of its billing program to show previous year's water usage, and to continue that program thereafter. An average water usage per residential property can be used to assess program effectiveness.

7.8 DMM 8 – School Education Program

This DMM recommends water suppliers to implement a school education program that includes providing educational materials and instructional assistance. This could include the distribution of free publications provided by the California Department of Water Resources (DWR) and American Water Works Association (AWWA). These handouts would meet state education framework requirements. Follow-up questionnaires to teachers would assist in evaluation of program effectiveness in 2014.

7.9 DMM 9 – Conservation Programs for Commercial, Industrial, and Institutional Accounts

The City does not currently have a conservation program for commercial, industrial and institutional accounts. These accounts are currently metered and charged in accordance with the quantity of used water on an increasing rate basis for increased water usage. The City will consider, beginning in 2014, undertaking surveys and follow-up measures for its major industrial accounts and the public school system. Metered usage comparisons will provide an evaluation of program effectiveness.

7.10 DMM 10 – Wholesale Agency Programs

This DMM applies to wholesale agencies and defines a wholesaler's role in terms of financial, technical, and programmatic assistance to its retail agencies in implementing DMMs. The City is not a water wholesaler.

7.11 DMM 11 – Conservation Pricing

There are no seasonal rates; the present rate structure is an increasing rate structure that currently bills based on the volume of metered use.

Fee schedules for Exeter and other communities are included in Appendix K. Water meters are read every month, and consumers are billed monthly.

7.12 DMM 12 – Water Conservation Coordinator

The Director of Public Works is the water conservation coordinator for the City. The conservation coordinator is responsible for coordinating and expanding the City's water conservation program and providing residents with useful water conservation information.

7.13 DMM 13 – Water Waste Prohibitions

The City will develop an ordinance to prohibit and minimize water waste. This will focus on conservation efforts, water softener use, and scheduling of appropriate lawn watering times. This will be fully developed in 2013-2014. Evaluating overall City water usage or user survey will be used to determine the programs effectiveness.

7.14 DMM 14 – Residential Ultra-Low-Flush Toilet Replacement Programs

State legislation requires the installation of efficient plumbing in new construction, and effective in 1994 required that only ULFT be sold in California. Homes constructed since 1994 in the City have ULFT. The Building Department also requires that residential remodeling be accompanied by retrofitting with low-flow fixtures. The building department will begin to keep track of all relevant data for program effectiveness evaluation.

CHAPTER EIGHT – WATER SHORTAGE CONTINGENCY PLAN

8.1 Stages of Actions

LAW

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632. (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

10632. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

10632. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

10632. (f) Penalties or charges for excessive use, where applicable.

8.1.1 WATER SHORTAGE STAGES AND REDUCTION OBJECTIVES

Supply capacity must be designed to meet MDD plus standby and thus meet demands through the planning horizon of 2030. The 2030 standby capacity, reserved for emergency conditions such as equipment malfunctions, is estimated at 86 percent (4,797gpm).¹² [Checklist #6, 10632(b)]

Water agencies relying solely on groundwater, such as the City, are much less likely to experience water shortages than those agencies relying primarily on surface water. As a good precautionary measure, this Chapter addresses water management tools and options that can be utilized to maximize resources and minimize the need to import water from other regions. [Checklist #5, §10620(f)]

8.1.2 WATER REDUCTION STAGE TRIGGERING MECHANISMS

Emergency response actions would take effect when the City Administrator declares that the City is unable to provide sufficient water supply to meet ordinary demands, to the extent that insufficient supplies would be available for human consumption, sanitation and fire protection. The declaration would be based on the City's judgment as to the degree of the immediate or future supply deficiency. Table 8.1-1 provides guidelines to assist in declaring water shortage stages. [Checklist #35, §10632(a)]

¹² Chapter 4, Reliability Planning

A combination of voluntary and mandatory water conservation measures would be used to reduce water usage in the event of water shortages.

Table 8.1-2 outlines reduction objectives for each stage.

**Table 8.1-1
Guide for Declaring Water Shortage Stages**

Stage	Condition
1	<ul style="list-style-type: none"> ▪ Two or more of municipal wells out of service due to noncompliance with drinking water standards or other emergencies ▪ Warm weather patterns typical of summer months
2	<ul style="list-style-type: none"> ▪ Prolonged periods of low water pressure ▪ Three or more of municipal wells out of service due to noncompliance with drinking water standards or other emergency ▪ Warm weather patterns typical of summer months
3	<ul style="list-style-type: none"> ▪ Prolonged periods of low water pressure ▪ Four or more of municipal wells out of service due to noncompliance with drinking water standards or other emergency ▪ Warm weather patterns typical of summer months

**Table 8.1-2
Water Usage Reduction Objectives**

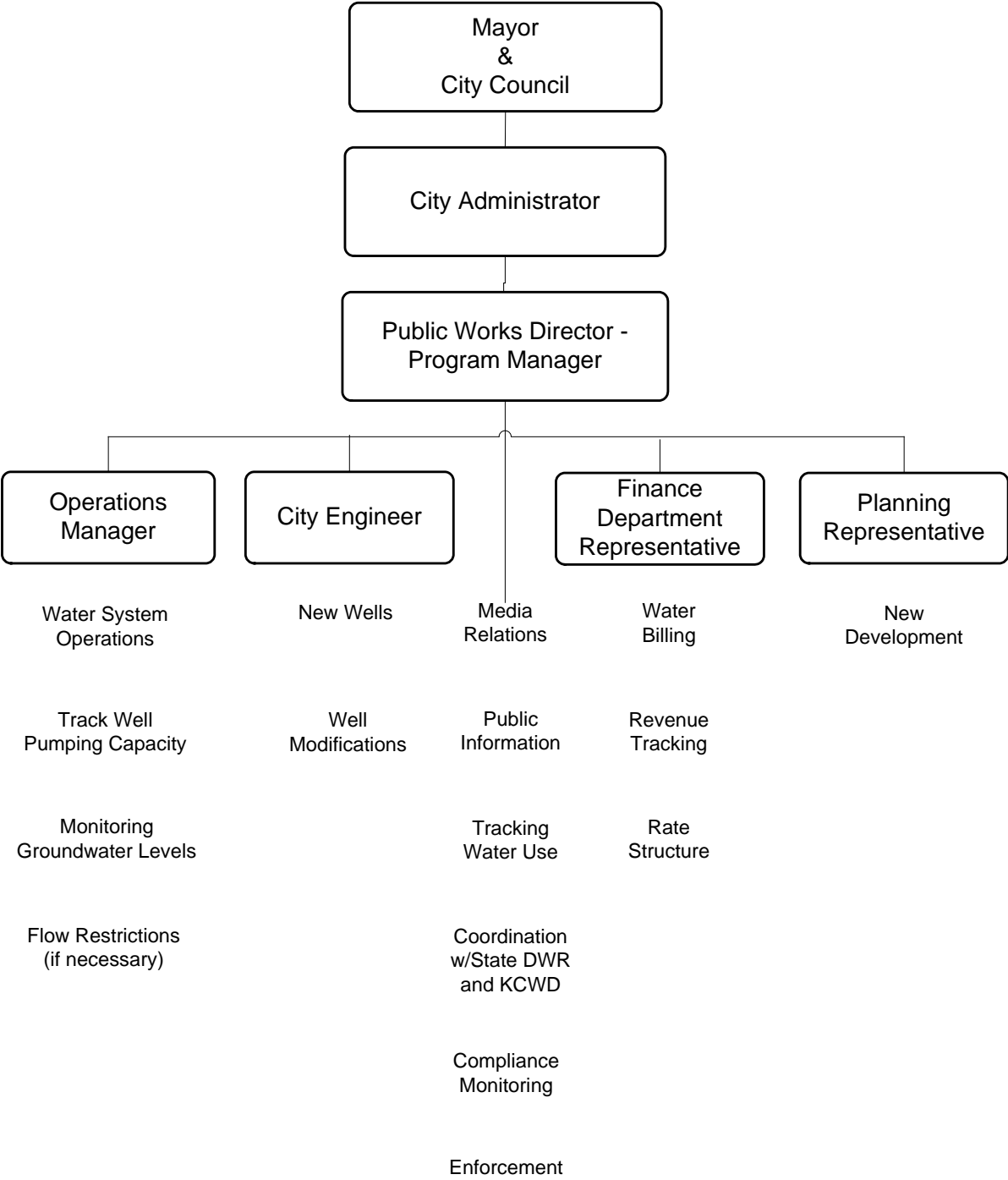
Stage	Description	Reduction Objective
1	(Minor Shortage Potential)	10-20% reduction in total water demands from baseline
2	(Moderate Shortage Potential)	20-35% reduction in total water demands from baseline
3	(Critical Shortage Potential)	35-50% reduction in total water demands from baseline

8.1.3 ADMINISTRATION OF WATER SHORTAGE PROGRAM

The administration of a water shortage program as described in this section would involve coordination among a number of City departments. It is anticipated that the Public Works Department would have primary responsibility for managing the program, since it is responsible for the City's water system. The Public Works Director would be the Program Manager and thus the primary coordinator of water shortage activities.

An appropriate organizational structure for a water shortage management team would be determined based on the actual situation. Figure 8.1-1 presents an example of a typical organization structure. Specific individuals would be designated to fill the identified roles. The City would not have to hire additional staff or outside contractors to implement the program.

Water Shortage Program Organizational Structure
Figure 8.1-1



8.1.4 ADMINISTRATIVE ELEMENTS OF WATER SHORTAGE PROGRAM

The major elements to be considered in administering and implementing the program would include: [Checklist #38 & #39, §§10632(d)&(e)]

- Identifying the City staff members to fill the key roles on the water shortage management team.
- Intensifying the public information program to provide comprehensive information on necessary actions that must be undertaken by the City and by the public. The scope of the public information program can be developed by reviewing published references, especially those published by DWR, and researching successful aspects of current programs conducted by neighboring water agencies.
- A public information hotline may be advisable to answer any questions regarding the program.
- Monitoring program effectiveness: Ongoing monitoring will be needed to track supply availability and actual water user reductions. This procedure will allow the City to continuously re-evaluate the situation and make informal decisions as to whether another reduction level is needed.
- Enforcing program requirements: For the 35 to 50 percent reduction program, enforcement of water use prohibitions and water use allocations would be important in achieving the program goals. Inspectors and enforcement personnel could be identified among City staff in the community on other business, such as police, park department staff, street maintenance staff and meter readers.
- Dealing with equity issues that might arise from the mandatory restrictions or higher water rates: Depending on the level of restriction, there may be a need to address concerns of individual customers who might have special conditions or extenuating circumstances and are unduly affected by the program. A procedure should be identified for dealing with such special requests and/or for reviewing specific accounts.
- Coordinating with other relevant local entities: Coordination, as needed, continues with the Kaweah Delta Water Conservation District, the principal water management agency near Exeter.
- Adjusting water rates: Revenues from water sales should be reviewed periodically to determine whether an increase in rates might be needed to cover revenue shortfalls due to the decrease in demand.
- Addressing new development proposals: During periods of severe water shortage, it may be necessary to impose additional requirements on new development to reduce new demand or to temporarily curtail new hook-ups.
- It is essential that the water shortage contingency plan, as a component of the Urban Water Management Plan, undergoes a formal public review process including a public

hearing. A thorough public review process will help minimize future objections when mandatory prohibitions are needed.

- Prohibit the use of potable water for street cleaning.

8.2 Water Shortage Contingency Ordinance or Resolution

LAW

10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier.

10632. (h) A draft water shortage contingency resolution or ordinance.

A copy of the proposed adoption resolution is included in Appendix J. Thirty days prior to adoption, a notice of the public hearing will be in the local newspaper, notifying interested parties that the 2010 UWMP, including the Urban Water Shortage Contingency Plan (Contingency Plan) is available at various City facilities. The City will, after the hearing, submit the amended draft Plan to the Department of Water Resources for review and recommended corrections. The City Council will thereafter, at a properly noticed meeting, re-adopt the Plan, by resolution, as revised in accord with the recommended corrections. [Checklist #42, §10632(h)]

8.3 Mandatory Prohibitions on Water Wasting

Mandatory compliance measures enacted during a water shortage are more severe than voluntary measures, produce greater savings, and are less costly to the utility. The principal drawback to these measures is customer resentment if the measures are not seen as equitable. Therefore, such measures need to be accompanied by a good public relations campaign.

Mandatory measures may include:

- Ordinances making water waste illegal
- Ordinances controlling landscape irrigation
- Ordinances restricting non-irrigation outdoor water uses
- Prohibitions on new connections or the incorporation of new areas
- Rationing

Prohibitions on new development may conflict with other policies and needs. However, if existing customers are called upon to make sacrifices during a drought period, they may feel that water agencies should concentrate on fulfilling current obligations rather than taking on new customers. Such prohibitions may need to be considered in the event of a critical shortage, such as the 50 percent reduction program. If necessary, an offset program might be considered whereby developers demonstrate that they will implement measures to conserve at least as much water in the existing community as their new project will use. In some cases, a two to one offset might be required of the new development. The City currently enforces Municipal Code Section 13.08, Title 13. [Checklist #40, §10632(f)]

8.4 Revenue and Expenditure Impacts/Measures to Overcome Impacts

LAW

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier...

10632 (g) {An analysis of the impacts of each of the proposed measures to overcome those {revenue and expenditure impacts, such as the development of reserves and rate adjustments.

The majority of operating costs for most water agencies are fixed rather than a function of the amount of water sold. As a result, when significant conservation programs are undertaken, it is frequently necessary to raise water rates because the revenue generated is based on lower total consumption while the costs, and resulting revenue required, are basically fixed. Typically water rates need to be increased by the percentages listed in Table 8.4-1 when the indicated stages are implemented. However, reductions in water demands, especially peak demands, can delay the need to develop costly new water sources in growing communities. [Checklist #41, §10632(g)]

The City does not currently have an emergency fund but will consider establishing such a fund to mitigate the impacts of a water shortage. The fund would then be used to stabilize water rates during periods of water shortage or disasters affecting the water supplies. Excess water revenues collected as a result of shortage rate adjustments would be used to enhance the emergency fund.

**Table 8.4-1
Guide for Rate Adjustment**

Stage	Rate Adjustment
1	25 percent increase over pre-shortage rates
2	50 percent increase over pre-shortage rates
3	100 percent increase over pre-shortage rates
End of Water Shortage Emergency	15 percent increase over pre-shortage rates. (This rate increase is implemented based on historical information from communities that experienced water shortage and found that consumption rate (gpcd) does not return to pre-shortage levels. In anticipation of reduced sales, the City rates would be set for one year at 115 percent of the pre-shortage rates. This rate increase should be re-evaluated every two years.)

8.5 Actions during a Catastrophic Interruption

LAW

10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier...

10632 (c) Actions to be undertaken by the urban supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

During declared shortages, or when a shortage declaration appears imminent, the City Administrator will activate a water shortage response team. Shortages can be caused by an earthquake or other catastrophic interruption. The team includes: public utilities, water, fire, planning, health and emergency services. Other actions and procedures to be followed during catastrophic events will be developed. [Checklist #37, §10632(c)]

8.6 Reduction Measuring Mechanism

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The City's water system is supplied by groundwater wells. Each well includes a flow-monitoring device that records the amount of water entering the City's distribution system. The City would use these devices to monitor actual citywide reductions in water use. [Checklist #43, §10632(g)]

CHAPTER NINE – WATER RECYCLING

LAW

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplied. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:

10633 (a). A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

10633 (b). A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.

10633 (c). A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse determination with regard to the technical and economic feasibility of serving those uses, groundwater recharge, and other appropriate use...

10633 (d). The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

10633 (e). A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

10633 (f). A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.

9.1 Water Recycling Programs

The City of Exeter and the businesses supplied by the City's water system employ minimal water recycling procedures. Municipal operations and local industry activities are not to the development level that would significantly impact the amount of City water supply from the groundwater basin. Although no formal water recycling plan is used, efforts are made to minimize the amount of groundwater use and maximize opportunities for groundwater recharge. This Plan section describes the existing and planned water recycling programs. [Checklist #44, §10633]

9.2 Existing City Wastewater Treatment and Recycling Facilities

The City of Exeter provides wastewater services to its residential, commercial, and industrial water users. The Waste Water Treatment Facility (WWTF) operates under Waste Discharge Requirement R5-2002-0062, issued by the RWQCB.

The WWTF directs secondary treatment effluent into effluent ponds where it is stored for ground percolation and evaporation. Groundwater recharge is the only form of water recycling used in the City. Although there are no direct economic benefits, groundwater recharge potentially reduces the depth of operation for local water wells.

The WWTF effluent ponds and the three storm water basins within the City serve as the City's primary source of groundwater recharge and reuse. The operations of the surrounding agricultural facilities serve as a secondary source of ground water recharge. Although no formal plans currently exist, efficient use of irrigation water is a necessity in running a cost effective agricultural business. Consequentially, groundwater recharge is a beneficial by-product of running effective agricultural facilities. No other water recycling operations are currently in place. [Checklist #49, §10633(e)]

9.3 Projected Recycling Usage

It is anticipated that the water recycled by local agricultural facilities will remain constant throughout the planning period. The City's recycled domestic effluent will increase proportionate to anticipated population growth.

As the State continues efforts to increase groundwater recharge and minimize water usage, the City will continue to evaluate and, as opportunities exist, implement effective practices to increase the amount of water recycling programs within the City. Currently, the majority of water used in and around the City is effectively discharged for groundwater percolation through basins or agricultural fields. There are no public or private facility operations that utilize a large enough quantity of water that would provide the opportunity to utilize a specific water recycling program. At this time, the development of any incentive program to encourage water recycling would be unproductive without the current existence of any facility to take part in such a program.

Future water recycling opportunities will be evaluated for new developments within the City. As the City grows in water usage, the City will look towards developing specific best management practices in regards to water recycling for all operations within the City's sphere of influence.

Table 9.3-1
Wastewater Collection and Treatment – AF Year¹
 [Checklist #45, §10633(a)]

Type of Wastewater	2000	2005	2010	2015	2020	2025	2030	2035	2040
Wastewater collected & treated in service area	1,039*	1,093*	1,202*	1,319	1,448	1,589	1,745	1,915	2,102
Volume that meets recycled water standard	1,039*	1,093*	1,202*	1,319	1,448	1,589	1,745	1,915	2,102

9.4 Other Water Conservation Practices

The City is aware of the importance of implementing good water conservation practices especially with the current condition of declining water resources within the State. Although not many opportunities for water recycling exist for an area with relatively low water consumption, the City of Exeter plans to responsibly manage local water resources through implementing other water conservation practices.

It is the intention of the City to follow water conservation efforts as indicated in Chapter Eight of the Water System Master Plan adopted by the City in September 2008 (Appendix M). These conservation efforts include continued use of water meters, xeriscape landscaping, and public education programs.

¹ Projected wastewater uses are based on actual treatment volumes* from Exeter's WWTP. The future volumes are projected using the anticipated growth rate of 1.88%.